

Citation for published version:

Sergeeva, N & Roehrich, K 2018, 'Temporary multi-organizations: Constructing identities to realize performance improvements', *Industrial Marketing Management*, vol. 75, pp. 184-192.
<https://doi.org/10.1016/j.indmarman.2018.05.007>

DOI:

[10.1016/j.indmarman.2018.05.007](https://doi.org/10.1016/j.indmarman.2018.05.007)

Publication date:

2018

Document Version

Peer reviewed version

[Link to publication](#)

Publisher Rights

CC BY-NC-ND

University of Bath

Alternative formats

If you require this document in an alternative format, please contact:
openaccess@bath.ac.uk

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LEARNING IN TEMPORARY MULTI-ORGANIZATIONS: IMPROVING PERFORMANCE AND CONSTRUCTING IDENTITIES

Natalya Sergeeva^a and Jens K. Roehrich^{,b}*

^a Bartlett School of Construction and Project Management, University College
London, UK

^b HPC Supply Chain Innovation Lab, Information, Decisions and Operations
Division, School of Management, University of Bath, UK

*Author for correspondence: Natalya Sergeeva: Tel.: +44 (0) 2076794466; e-mail: n.sergeeva@ucl.ac.uk; Bartlett School of Construction and Project Management, University College London, 1-19 Torrington Place, London, WC1E 7HB, UK

Jens K. Roehrich: Tel.: +44 (0) 1225 385060; e-mail: j.roehrich@bath.ac.uk; HPC Supply Chain Innovation Lab, Information, Decisions and Operations Division, School of Management, University of Bath, Claverton Down, Bath BA2 7AY, UK

Abstract

This article applies organizational identity theory to explore how temporary multi-organisations (TMO) construct their identities as learning organizations. The study draws on 33 in-depth interviews from TMOs in the UK construction, engineering, and infrastructure industries. Interviews were further triangulated with data from a series of industry events and workshops. The investigation explores key characteristics of learning in TMOs and their impact on performance. The research demonstrates the shift towards informal ways of learning and importance of narratives about the purpose of TMOs. Boundary spanners actively engage in sharing learning through stories about lessons learned from past experiences in managing TMOs.

Keywords: Boundary spanners; identity; learning organization; narratives; temporary multi-organizations; stories

Highlights

- Learning in temporary multi-organizations impacts their performance improvement
- There is a shift towards more informal approaches to learning in temporary multi-organizations
- Boundary spanners actively engage in sharing learning through different communication channels
- Temporary organizations socially construct their identities as learning organizations in spoken, symbolic and written forms
- Storytelling plays an important role in constructing identity of learning organizations

1. Introduction

Temporary multi-organizations (TMOs) are typically set up for a specific period of time to deliver innovative products or services across a range of industries such as construction, infrastructure, and engineering (Bakker, DeFillippi, Schwab, & Sydow, 2016; Burke & Morley, 2016; Stjerne & Svejenova, 2016). Large-scale infrastructure assets such as water facilities, airports, roads, railways are complex systems that require a large investment commitment, take many years to develop and build, involve multiple public and private stakeholders, and have long-lasting impact on the economy, the environment, and society as a whole (Brookes, Sage, Dainty, Locatelli, & Whyte, 2017; Flyvbjerg, 2014; Flyvbjerg, Bruzelius, & Rothengatter, 2003). Creating and maintaining complex systems in TMOs requires the mobilization of a wide range of capabilities including contractual and relational governance, innovation, and learning (Flyvbjerg, 2017; Köhtamäki, Radetino, & Möller, 2018). These are to be mobilized within the TMOs (Davies, Brady, & Hobday, 2006; Gann & Salter, 2000).

Despite the growth in number and opportunities to benefit from learning in TMOs, these temporary organizational structures continue to have poor performance records (Davies, Gann, & Douglas, 2009). Most TMOs are delivered over time, over budget and fail to achieve users' needs (Gann, Davies, & Dodgson, 2017). It is a major challenge for TMOs to learn throughout their life-cycle in order to be delivered on time, on budget and to specifications (Brady & Davies, 2004; Winch, 2014). The majority of extant literature emphasizes learning capability which is required during the front-end planning in seeking to reduce uncertainties (Williams & Samset, 2010). More recent studies have started to recognize the importance of the back-end operation where lessons are learned and learning is transferred to future TMOs (Zerjav, Edkins, & Davies,

2018). In this paper we integrate the views by looking at learning across TMOs rather than focusing on particular phases.

It is often taken for granted that learning capabilities in temporary organizations are not very different from those more permanent (project-based) organizations (Brookes *et al.*, 2017; Winch, 2014). The specific characteristics of TMOs that shape learning capabilities are: (i) being bespoke (created for a specific purpose); (ii) one-off (specific end date, but usually long life-span throughout which managers keep changing; at the end TMO members separate and not always work together on subsequent TMOs); (iii) alliance contracting (collaborative framework, co-creative process which promotes openness, trust, risk and responsibility sharing, innovation); (iv) substantial risks (financial, operational, reputational, innovation); and (v) with different organizational cultures merging together (e.g. clients/owners and suppliers) which shape learning practices (Gann *et al.*, 2017). Learning in permanent organizations tends to be more continuous and routinized when compared to TMOs where learning is more dynamic due to the transient nature of the business (Hobday, 2000; Prencipe & Tell, 2001). Hence, the frameworks and models on learning developed for permanent organizations (Duffield & Whitty, 2015; Wei & Miraglia, 2017) may not be applicable to more temporary organizations and further research is needed to address this gap in extant literature.

Thus, the following overarching research questions are positioned: (i) *What are the key characteristics of learning in TMOs?* And (ii) *What is the impact of these key characteristics on TMOs' performance?* We theoretically ground our study in extant literature on learning in TMOs versus more permanent organizations. When exploring the impact of key characteristics of learning in TMOs on performance, we found that part of this impact is the ways they construct their identities as learning organizations. Hence we

frame our analysis deploying organizational identity theory (Alvesson, Ashcraft, & Thomas, 2008; Gioia, Schulz, & Corley, 2000; Schultz & Hernes, 2013). Empirical findings are based on rich datasets of TMOs in the UK construction, engineering, and infrastructure sectors and permanent project-based firms (outlined in Table 2 and in the Appendix).

The study offers two distinct, yet inter-related, contributions. First, the study offers theoretical and empirical insights into key characteristics of learning in TMOs and compares them with more permanent organizations. This contributes to the temporary/permanent organization dilemma in research on learning. We also investigate the key characteristics of TMOs and their influence on learning and organizational performance. Second, we adopted an underutilized theoretical lens - organizational identity perspective - in understanding the ways TMOs construct their identities as learning organizations (Grabher, 2004). This deepens our understanding of the impact of key characteristics of learning in TMOs on performance.

In the following sections, we conceptualize learning in TMOs and identify a set of emerging learning characteristics. We explore individual and organizational learning using organizational identity perspective. We then discuss the research method and present our data analysis. Key findings are then discussed in light of extant theory, drawing out key theoretical contributions. We conclude by drawing out practical implications, research limitations, and future research avenues.

2. Theoretical background

2.1 Learning in TMOs and permanent organizations

In this paper we define organizational learning as a process of creating, retaining, and transferring knowledge within an organization (Bresnen, Edelman, Newell, Scarbrough, & Swan, 2003). Individual learning is key to drive organizational learning (Tennant & Fernie, 2013; Watkins & Marsick, 1993). Prior research has offered insights into learning mainly in permanent organizational structures and has explored more formal approaches such as databases and written guidelines (Huang, Luo, Liu, & Yang, 2016; Tempest & Starkey, 2004), yet scant attention has been paid to learning in temporary multi-organizational arrangements, more informal approaches (building communities, social networks, using stories), and the role of key individuals (Bartsch *et al.*, 2013; Bechky, 2006; Manning, 2017). For example, Calantone and Cavusgil (2002) investigate the relationship between learning, innovation, and firm performance based on in-depth interviews with senior managers in contemporary permanent organizations across different industries in the USA. In their study, learning orientation of an organization is described through four components including commitment to learning, shared vision, open-mindedness, and intra-organizational knowledge sharing. A learning orientation in turn influenced by the organizations are likely to promote learning as one of their core values. Whilst some of these characteristics may be applicable to understand learning in TMOs, there are other components that need to be addressed, including temporary and transient nature of their businesses and the importance of key individuals and their leading roles in constructing narratives about TMOs.

TMOs and their members are influenced by a focus on specified delivery focus and deadlines leaving limited time to reflect on previous experiences in managing TMOs to, for instance, improve processes and activities, and thus vital learning opportunities might be missed (Flyvbjerg *et al.*, 2003; Davies *et al.*, 2009). Several studies argue that

TMOs often fail or underperform due to poor decisions made during the planning front-end stage (Gann *et al.*, 2017; Flyvbjerg, 2014). TMOs strive to drive knowledge creation throughout the lifespan from the front-end phase to the back-end maintenance and operation phase (Bakker *et al.*, 2016; Brookes *et al.*, 2017). A TMO improves performance over time as it gains experiences, and hence creates new knowledge. The majority of extant studies have adopted a system thinking and practice theory perspectives on learning capabilities and mainly applied to more permanent organizations (Brady & Davies, 2004; Davies *et al.*, 2006; Gann & Salter, 2000). However, these perspectives offer very limited to explain how specific characteristics of TMOs shape learning capabilities. Little is known about the key characteristics of the dynamic learning process in TMOs and their impact on performance.

The majority of TMOs operate in a context of collaborative working meaning that they move away from mainly coordinating via formal, more rigid organizational structures (e.g. rules, schedules, division of labor) towards an emphasis on more interpersonal coordination and informal communication mechanisms (Bechky, 2006; Brookes *et al.*, 2017), highlighting the importance of individuals to drive learning. In TMOs, different interests, professions and organizations are brought together to drive and promote learning (Bartsch, Ebers, & Maurer, 2013). However, prior studies offer limited empirical insights into the roles of key individuals driving and promoting learning in temporary multi-organizational settings (e.g. studies calling for further research: Bakker *et al.*, 2016; Burke & Morley, 2016; Ryan & O'Malley, 2016). As outlined in the introduction, TMOs are characterized by temporariness, high uncertainty and risks, multi-cultural settings, transience, flexible relationships, and these characteristics impact

dynamic learning process in TMOs. Table 1 summarizes key learning characteristics in TMOs and their influence on performance, key authors and identified gaps. These are discussed in the section that follows.

PLEASE INSERT TABLE 1 ABOUT HERE

2.2 Key learning characteristics in TMOs

TMOs are characterized by significant scale, long-term delivery and operation through coalition and collaborations across the boundaries of organizations and projects. TMOs offer dynamic learning capabilities (Burke & Morley, 2016). That means, new configurations of team members based on specific expertise and experience at different phases of a TMO's lifespan is a source of innovation that in turn improves performance (Davies *et al.*, 2009). Lessons learned from past experience in TMOs can be stored in databases and files which can then be used by team members in future TMOs to avoid past mistakes and deliver the final outcomes successfully (Davies *et al.*, 2017). In addition to formal approaches to learning (e.g. reports, databases, contract), individuals create a social network of relationships (e.g. events, discussion groups, communities of practices) to share knowledge and experiences.

Interactionist approaches to roles focus on the ways individuals can (re)construct social arrangements through role-taking (Bechky, 2006; Burke & Morley, 2016). The role of individual boundary-spanners is increasingly emphasized in the literature on learning, especially in the settings of multi-organizational and multi-project interfaces (Brookes *et al.*, 2017; Zaheer, McEvily, & Perrone, 1998). Boundary-spanners are vital to deal with diverse individuals and organizations coming together to deliver outcomes in TMOs (Aldrich &

Herker, 1977; Huang *et al.*, 2016). In other words, their frequent information exchange within and across organizational and project boundaries. Boundary-spanners play a key role in addressing uncertainty and equivocality stemming from a TMO's environment and processes by crafting, receiving, processing, and communicating information (Lenthoen & Martinsuo, 2008). They regularly communicate across firm boundaries and perform activities that support intra- and inter-organizational relationships (Perrone, Zaheer, & McEvily, 2003). Boundary-spanners also tend to relocate across TMOs to transfer their knowledge and experience to other team members (Brookes *et al.*, 2017).

Knowledge and the way in which boundary-spanners interpret (sense-making) and promote learning (sense-giving) is vital to constructing learning organization (Gioia *et al.*, 2000). In other words, the ways of promoting learning by boundary-spanners entails an effort to construct learning organization (Bakker *et al.*, 2016). For instance, Huang *et al.* (2016) apply process perspective on interpersonal ties in inter-organizational exchanges, demonstrating the ways boundary-spanners perform two roles: (i) serving as a robust base for connecting and sharing information. They decode, filter and pass the received information to relevant internal users; and (ii) acting as a relationship lubricant for effective cooperation and problem solving. Yet, prior studies have not connected the informal roles of boundary spanners with organizational identity theory in terms of the ways TMOs construct their identities as learning organizations. This study elaborates theory of learning in TMOs by examining informal roles and approaches to learning and the ways they construct identities.

2.3 Organization identity perspective on learning in TMOs

We position social identity theory in explaining the ways learning is driven and promoted in TMOs by key individuals. Weick's conceptual ideas shed some light on the connection between learning and meaning making, suggesting that components of identity construction rise to relevance when guided by the underpinnings of learning: *"Only with ambivalent use of previous knowledge systems are able both to benefit from lessons learned and to update either their actions or meanings in ways that adapt to changes in the system and its context"* (Weick, Sutcliffe, & Obstfield, 2005: 414). This quotation connects learning with future changes, with emphasis being placed on the importance of context and meaning making process. Limited empirical research has specifically explored learning from organizational identity perspective (Brown & Starkey, 2000; Handley, Sturdy, Fincham, & Clark, 2006). We apply a definition of organizational identity as a sense of who organizational members are, or who they are becoming, as an organization (Corley & Gioia, 2004; Gioia *et al.*, 2000). Following Schultz and Hernes (2013), we focus on identity labels and their associated meanings serving as key components of organizational identity construction. Past research has recognized the temporary nature of organizational identity construction, for example, the ways organizations re-construct their identities through time (Clegg, Kornberger, & Rhodes, 2005). To date, little is known about the ways in which TMOs construct their identities as 'learning organizations'. The issue of identity construction as learning organization is relevant to both permanent and temporary organizations. Yet, given the specific characteristics of TMOs (e.g. high risks associated with reputation, high expectations from the public), it is even more critical to their performance (Brookes *et al.*, 2017). Of further note is a role of narratives when a company attempts to become a learning organization increasingly emphasized in the literature (Vaara, Sonenshein, & Boje, 2016). Organizations tend to self-promote themselves as learning organizations through verbal,

written and symbolic narratives. In other words, TMOs can be socially constructed as ‘learning’ through the ways people speak, communicate, interpret, and share knowledge in the context of project organizing. Senior managers play an important role in articulating these narratives and stories. Yet, there is a gap in current knowledge in understanding of the nature of narratives mobilized by senior managers in temporary multi-organizational settings in constructing identities of learning organizations and their broader implications for performance improvement and identity construction.

3. Research methodology

3.1 Research design and context

The research deploys an abductive, multiple-case study research approach (Eisenhardt, 1989), paralleling empirical fieldwork with theoretical conceptualizations. Seeking to address a gap in extant studies, we elaborate social identity theory in the context of TMOs, investigating individuals in driving and promoting learning in their natural context. It allowed the researchers to explore individual and organizational learning in temporary versus permanent organizations. Data were collected from in-depth interviews with 33 senior managers from UK-based construction, engineering, and infrastructure firms. Table 2 summarizes background information about the nature of the studied temporary and permanent project-based organizations. TMOs were selected based on the following key criteria: (i) temporary organization created to deliver products/services and then disbanded once the work was completed; and (ii) the project-based nature of organizing activities.

PLEASE INSERT TABLE 2 ABOUT HERE

3.2 Data collection and analysis

Overall, 33 face-to-face, in-depth interviews with senior managers and directors from UK-based infrastructure owner, contractor and supplier organizations were conducted.

Interviewees were selected on the basis of their professional experiences and their roles as active individuals within an innovation and knowledge management system [boundary spanners] (Stamper & Johlke, 2003). They played an active role in system integration and knowledge exchange within and across multi-organizational and multi-project interfaces. On average, interviewees have more than ten years of experience working in project-based settings during their career paths. The interviews were one-to-one, typically taking place in interviewees' offices. The duration of the interviews varied from 32 to 75 minutes with an average of 58 minutes. The adopted social identity theory guided the design of the interview guide with questions focused around making sense, interpreting, synthesizing, and transferring lessons learned about past failures and successes. Interviews were taped and transcribed verbatim, whilst we assured confidentiality of participating companies and individuals. Data reliability was further supported by triangulation of data sources including company reports, presentations, and data collected via attending a series of industry events and workshops (Appendix). To strengthen construct validity, our study deployed the following remedies: using manifold sources of evidence, building a chain of events, and having case reports reviewed by interviewees (Gibbert, Ruigrok, & Wicki, 2008).

Data collection and analysis processes occurred in parallel based on how data matched existing, modified, or emerging understanding of the phenomenon (Miles & Huberman, 1994). The analysis has focused on explaining the differences between temporary and permanent organizations, owners and suppliers, in the ways organizations and individuals there within construct their identity as learning organizations. It comprises

investigation of individual and organizational competencies to capture, interpret and synthesize learning from past experiences and adapt to emergent practices, and use lessons learned to learn and improve. The focus was on identifying the challenges in learning in terms of the extent to which there is an alignment between individuals and organizations, how conflicts are resolved and synergy is achieved. Of further interest was to identify good practices in learning in TMOs.

The transcripts were read by researchers several times over; identifying, analyzing, and reporting patterns (themes) within the data. Analysis included broader codes such as organizations' characteristics and more specific codes zooming in on the concepts under study such as individual and organizational learning, identity construction processes. The researchers started with noticing patterns of meaning and potential interests in the data. The systematic analysis was reflective in nature by making sense of the identified themes and interpreting them in relation to theory. The themes were reviewed and refined to ensure they form coherent patterns. The reviewed themes were named and clustered under headings that relate to the research question and theoretical framework. Our analysis was concerned primarily with common patterns across different organizations (temporary vs permanent, owners and suppliers) and across individuals, where differences were noted, further investigated, and reconciled (Poole & Van de Ven, 1989). The following sections present key findings derived from the thematic analysis.

4. Findings

Findings are structured to initially outline key TMO characteristics and their impact on learning and performance. We then delve deeper into the processes of identity construction of TMOs as learning organizations. More specifically, we uncover the key components of

learning in TMOs including key individuals and their roles in driving learning, the interplay between formal and informal ways of learning, and personalized stories about learning.

4.1 Key learning characteristics in TMOs and their influence on performance

The purpose of construction, engineering, and infrastructure TMOs is to successfully deliver assets on time and on budget (e.g. a new railway, a new tunnel, a new building), achieve organizational benefits, and create value for customers. TMOs (often were labelled as ‘pop-up clients’ by the interviewees) – from Heathrow Terminal 5, via the Olympic Park and Crossrail towards Thames Tideway Tunnel and High-Speed Two rail link – place Britain in a unique position. This was articulated especially clearly by the CEO from water infrastructure TMO (#21): *“London has a permanent state of temporary organizations.*

There is an industry of people that actually move from one temporary organization to another; and many of which move and start the next one not realizing they have taken the culture of the organization with them, and then they get re-shaped by the new project and move on in a new direction”. The transient nature of TMOs means that people tend to move between TMOs by applying their past knowledge and experiences in re-shaping the culture and vision of a new TMO. This has important implications on the dynamic process of re-learning between TMOs and their influence on performance. Changes are at the core of the operation of TMOs: changes in people throughout stages of the life-cycle and between TMOs represent the transient nature of work environment within which TMOs operate. There was a clear comparison being made between special purpose TMO and business as usual permanent owner organizations:

“Because [Name of the organization] is such high-profile and contentious, a key part of being a leader is to actually to be able to articulate a very clear narrative around why

[Name of the organization] is important. Not just for the purpose of promoting it externally, but internally as well, to motivate people. People are knowing why they are doing it, and actually make sure we are delivering the right thing. Having a very clear narrative absolutely has been very important." (CEO from rail TMO, #19). The clear purpose of TMO is at the center of what they do which distinguishes it from permanent owner and supplier project-based firms (Davies *et al.*, 2017; Winch, 2014). Constructing a strong narrative about organizational identity for internal as well as external audiences is seen crucial for the delivery of TMOs.

Table 3 presents the identified key learning characteristics in TMOs and their influence on performance with the support from the empirical data. The transient nature reinforces the dynamics of people bringing their experiences from other TMOs, shaping culture and mind-set. The unique purpose drives learning and performance in TMOs. Narratives about the purpose of TMOs shape the dynamic process of learning and identity construction of TMOs as learning organizations.

PLEASE INSERT TABLE 3 ABOUT HERE

4.2 Constructing identity of 'learning TMO'

TMOs tend to actively promote learning in comparison to permanent organizations. They see themselves and are often recognized by other organizations as 'learning organizations':

"We were far more focused on actively promoting Learning Legacy. Learning Legacy has been a big theme for 2017 because we are in that space now - we are the client who has the opportunity to take the time and capture everything that we have done wrong and the lessons that we have learnt along the way. You will never get [names of permanent owner

organizations] doing Learning Legacy website because they are not special purpose client who will see to be upon the completion of their work. They are business as usual client who will be around for the next 20,30,40 years. [Name of the organization] is only here for 2 years. I am only here for 12 months. When the project is delivered the people will go."

(Program Control Director, #27). This quotation clearly points to the ways senior managers actively promote leaning legacy in TO as a popular narrative.

Senior managers have a strong belief and value in constructing identity of a learning organization. This is evident from the Head of Innovation of a water infrastructure TMO (#28): *"My ethos for the last 15 years is all about pick the right people and make sure they have got the sufficient knowledge and then get them to think in a right way. I just use the loose term collaboration, it is about sharing knowledge, sharing ways of doing things, so that we all work at big problems faced at infrastructure industry, and make a complete different to the future together."* Of particular note is the collective and collaborative way of sharing knowledge in the infrastructure sector. Similarly, Director of Asset Management of permanent client infrastructure organization demonstrates his ambition to create a learning organization: *"One of my ambitions is to create a learning organization. Some of that is through stability, consistency of approach. But absolutely how individuals learn and make it part of collective learning rather than something they will never do again because it hurt them. They have personal consequences because of it."*

Senior managers strive for consistent and stable approach for collective learning and creating a learning organization. This relates to the challenge emphasized by many interviewees about the next generation of project leaders: *"The biggest challenge we have got in the UK is how do we develop something that the next generation of leaders can learn from us. Because I do not think we have got the time. Actually, we are not that bad at doing*

projects at the moment. I feel we are not too bad at the moment because we have learnt all of that. We have a generation of people who have been through it who confidently can sell the picture, who make sure they get the right environment. But the next generation are going to be victims of our success. How could we leave them with a legacy, and capable owner has that, a framework for leadership, not management.” Of particular note is the emphasis being placed on ‘capable owner’ in creating learning legacy and providing a framework for leadership.

4.3 Individuals driving learning in TMOs

Most interviewees recognized that it is quite often down to an individual’s willingness and motivation to learn from past experiences and transfer it to new experiences. This emphasizes the role of key individuals to drive learning within TMOs and also capture information from external sources such as suppliers. The Development Director of UK major airport TMO (#31) shared his experience of learning from other senior management team and involvement in a community of infrastructure owners and suppliers committed to change: *“I get involved in things like Project 13. I believe what I learn will make the organization more efficient and add value. It is important to be in the conversation and actually we have something to offer.”* This quotation demonstrates a connection between individual learning driving organizational performance. It is a two-way process of TMO improving internal performance through learning and also sharing their best practices to wider communities of practices. A number of interviewees argued that TMO knowledge was created by boundary-spanners through capturing information, then analyzing it and being able to further develop it through *“making sense of information”, “applying it to our*

context”, and ultimately *“communicating it effectively”* internally within TMOs and externally across TMOs *“to stimulate learning”*.

Senior managers further reported that they found it difficult at times with so many emails and Twitter messages to *“actively participate, share knowledge, and experiences”* within and across organizations. The boundary-spanners interviewed were constantly seeking innovative ways of embedding information and driving learning to deliver projects successfully.

4.4 From formal towards more informal approaches to learning in TMOs

It was recognized by the interviewees that most both permanent and temporary project-based organizations have some form of formal processes in place to drive organizational learning via, for instance, databases and platforms to share knowledge, but there has been much stronger emphasis on more informal approaches to learning: *“We can write case studies. We can put stuff on our webpages. I think there is a place for cataloguing experiences. People can go and read it. My experience is that people quite often do not go and read it. Increasingly, the way we are going to do it in our business is to create a very connected, organic workforce, a sustainable workforce, where Jim knows Paul works in that job; Sue knows Susan did that. Learning, I think, is more organic in our company and quite often driven by key people [boundary-spanners] who then share key learning.”* (CEO, transport TMO, #18). TMOs are temporary, even though may last many years, and they disperse after completion, so the chances of creating a knowledge platform (such as databases) is problematic. Hence, the role of key individuals (boundary spanners, self-motivated individuals) and their networks is crucial to drive knowledge and learning initiatives.

Some interviewees stated that they do not have formal knowledge management systems in place, but they have established expert groups. These groups are networks across the business that are focused around selected areas of excellence or priorities such as Building Information Modelling Group, Innovation Group, and Market-Making Group. This creates learning across a network of people meeting and collaborating who feel comfortable with each other. The CEO from a permanent construction owner firm (#24) articulated this point especially clearly: *"We have about 15 groups in the organization. That creates networks of people; they meet and collaborate. This is driven by key people. They use examples or stories to share experiences. Eventually, network and communication become the most powerful, strongest way of sharing the learning."* This example underlines the argument that organizational learning is driven by individuals who share knowledge through personal stories and examples from their experience. This is consistent with the emergent recognition that knowledge transfers from the project setting to the permanent organization is mainly the transfer of individual knowledge focusing more on inter-personal and individual learning than on organizational learning (Aerts, Dooms, & Haezendonck, 2017).

The data further demonstrate that permanent supplier project-based firms have many difficulties in building their learning capabilities: *"We are not really using online tools, communication tools to transfer knowledge in the right way. We started to but it is not great. It is all based on the relationships you build by speaking to people rather than being a system"* (The Business Improvement Manager, permanent supplier firm, #5). This example places an emphasis on the need for online communities of practices where people can connect with each other when solving similar problems. The Regional Managing Director from a permanent construction owner and operator (#13) provided an example of collecting data from users based on interviews and conversations after the building project was

commissioned: *"You built the building, you use all the skills, you monitor the performance for the next twelve months. You interview people how usable the building is. The most important people are users who use it on a day-to-day basis. We have to have evidence-based design. Has that worked well? If not, what has not worked well? If it worked well, let us do that again. It is about collecting the data, understanding what the data means, and use it on the next project."* This example shows a boundary-spanner's initiative to gathering information about users' perceptions as a helpful ways of understanding meanings, and transferring it to future projects, hence driving learning. It also shows a need for a greater integration of front-end (planning and delivery phases) of a project with a back-end (operation phase). This is consistent with the literature on dynamic capabilities of TMOs from the delivery to operation (Zerjav *et al.*, 2018).

4.5 Personal stories about learning in TMOs

Personalized stories shared by boundary-spanners about past experiences were seen as vital for driving learning in TMOs. These personalized stories helped to translate *'very often rich and complex content'* to more *'manageable lessons learned'* by also *'providing a human touch'*. Boundary-spanners often added their own experience and challenges encountered to these personalized lessons which helped to better relate to lessons learned: *"We talk more and more about lessons learnt and most of the times the lessons learnt are linked more to failures than successes. It is about what we do better. People started to talk more openly about lessons learned. It is a cultural change talking about these things"* (Planning Manager from permanent construction project-based organization, #6, TO2). Culture is recognized as an important factor that influences learning in TMOs.

Senior managers emphasized the importance of using personalized examples or stories to *'translate information'* into more *'bite size junks'* and to then disseminate information within TMOs and externally. Information dissemination was described by the CEO of a permanent contractor firm (#24): *"When I go around our business I see a lot of little clusters of people meeting to share that knowledge. It comes down to leadership [by boundary-spanners] and culture to create a platform for these things to happen."* This quotation emphasizes the network of boundary spanning sharing their experiences informally.

There has been a recognition about the importance of *'transformational learning activities'* such as providing freedom to boundary-spanners to reward and recognize their key contributions to the TMOs and external environment. Interviewees acknowledged that individual members in TMOs face challenges in maximizing opportunities to learn, thus space and time should be provided to foster *'a more conducive learning environment and culture'*. Some TMOs even went further by encouraging boundary-spanners' willingness to take risks and manage uncertainty to drive performance improvements: *"I am interested in how I translate all the latest information into the best possible solution. That sometimes means looking at risks in a slightly different way. I have to be a different person in this room, in this building, to say to people I am willing to take a risk. I do not mind failure. I learn something from it. People are upset, they do not want failure in any capacity. That sometime means they do not want to take a risk. But we can learn a lot from failures and by taking some risks."* (Innovation Manager, Water infrastructure TMO, #39). Boundary-spanners were allowed by the organization to take *'some more degrees of risks'* to *'test ideas'* which might then help to drive learning. Director of Innovation and Continuous Improvement from major road infrastructure operator (#32) emphasized stories of success and failure over the textual

forms of knowledge sharing: *“It is really important that we run projects around risk. We want to capture failures as well as successful projects. We have some good stories where people, for example, a couple of guys invented a system to do different things, we kept them through the journey. It has been tested in major projects. Use those inventors as story. It is good to learn from that. You can learn a lot more from a story than just read 50-page report.”* This quotation reinforces the importance of spoken stories and examples of lessons learned from successes and failures in projects over the textual forms of narratives. It reinforces the shift from more formalized ways of learning to more informal.

In summary, personalized stories about learning are seen as important informal ways of learning. Whilst this applies to both permanent and temporary organizations, in the settings of TMOs which are characterized by high risks of failures, stories about lessons learned from successes and failures are seen even more valuable.

5. Discussion

In this section, key findings are discussed in light of extant literature. The section is structured around the two research questions stated in the introduction.

5.1 Key characteristics of learning in TMOs

The senior managers interviewed emphasized different organizing principles all of which shape learning in TMOs: multiple and complex temporariness, transient nature of the business, and special purpose of delivery. The temporary, transient and overlapping boundaries with multiple organizations and projects of TMOs make formal approaches to learning (e.g. databases, platforms and reports) problematic. We found the role of boundary spanners is crucial to drive learning initiatives. In order to support learning in TMOs, it is important to pay more attention to a network of individuals and their informal roles

(Bechky, 2006; Manning, 2017). Of particular note is the behavioral and cultural aspects in changing TMOs members' mind-set to become part of the identity of a learning organization. Boundary spanners play important roles in creating an environment in TMOs where learning is valued and employees are committed in enhancing learning capabilities. We found that in permanent organizations, the speed of learning tends to be slower than in TMOs, as there is less sense of urgency and there are established routinized learning practices that employees follow (Hobday, 2000; Prencipe & Tell, 2001).

We have found that TMOs play an important role in driving and promoting narratives of learning legacy in the UK infrastructure sector. This is consistent with the three domains of project organizing model developed by Winch (2014). Capable owners set directions and challenges and provide support for suppliers to innovate and learn from best practices across the sector. Managers in owner organizations create an environment for learning to emerge through both formal (e.g. databases, catalogues, case studies) and informal (e.g. conversations, telling stories, using examples) ways. The empirical data demonstrate a clear shift towards more informal ways of learning in TMOs. More specifically, findings show the importance of boundary spanners who actively engage in driving and promoting learning in the settings of intra- and inter-organizational and project interfaces (Aldrich & Herker, 1977; Bakker *et al.*, 2016). Narratives of learning legacy are also particular popular among senior managers interviewed.

We further found that TMOs socially construct their identities as learning organizations via spoken, symbolic, and written forms: sharing stories, videos via digital platforms, and write reports, blogs. There was more emphasis on the importance of narratives of organizational identities of TMOs when compared to permanent organizations. Past studies are silent about the role of narratives in identity construction, and their

especially critical role in temporary multi-organizational settings. This is one of our key contribution to knowledge to the extant studies. Considering the temporary and dynamic nature of TMOs, narratives about organizational identities motivate individuals to improve performance, but also play important role in recognition from external audiences (other organizations and public).

5.2 The impact of TMO's learning characteristics on performance

We have found that learning in TMOs is driven by past experiences from similar TMOs. This empirically proves the rule outlined by Davies *et al.* (2017) that TMOs capture prior experiences by studying past TMOs. There has been an agreement among interviewees on the importance of sharing learning from mistakes and failures as it has impact on performance improvement in the future by avoiding past mistakes and use past examples and experiences. However, there have been some disagreements amongst interviewees about the extent to which organizations are good at learning from failures. Whilst some interviewees take a more positive perspective, others are more skeptical (especially those from permanent supplier project-based firms) in indicating that failures are still often hidden from a public eye (due to reputation risks associated with TMOs). It is people who bring their experiences with them from work in previous TMOs and share their experiences with organizational and project members who face similar problems. Based on the interviewees' perceptions, sharing stories about lessons learned and support those who face similar issues impact on organizational performance improvement.

The personalized stories capture knowledge and learning in a highly articulated and accessible way (Clegg *et al.*, 2005). TMO members use personalized stories and share them with others through a process of storytelling (Rouleau, 2005). Key individuals who are

actively involved in transferring learning through networks and telling stories about past success and failures play an important role in the dynamic process of learning in TMOs. These individuals in their informal roles (e.g. boundary spanners, leaders, innovation champions and agents) are vital to drive learning in TMOs. Some authors have warned that learning is of highly situated nature and this may make transfer from one context (i.e. one specific TMO) into another problematic (Gherardi *et al.*, 1998). This is addressed by the importance of boundary-spanners in TMOs to 'de-situate' specific domain knowledge and to communicate relevant information to TMO's members helping to reduce uncertainty and equivocality (Ryan & O'Malley, 2016). With the help of personalized stories about past events, boundary-spanners are able to break down rich and complex content to transfer learning within and across TMOs.

6. Conclusions and implications

6.1 Summary of key contributions

This study contributes to our yet incomplete understanding of learning in temporary multi-organizations when compared to permanent project-based organizations. We found that narratives about the specific purpose of a TMO play an important role in constructing identity of 'learning organization'. This contributes to a better understanding of the ways TMOs socially construct their identities as learning organizations via narratives. Adopting organizational identity theory (Corley & Gioia, 2004; Gioia *et al.*, 2000; Schultz & Hernes, 2013), an under-utilized theoretical lens in extant studies on learning in TMOs, this study uncovers learning characteristics in TMOs and their impact on performance. Boundary spanners in their informal roles move across TMOs bringing and sharing their experiences

through stories about project failures and successes facilitates learning and improves performance.

6.2 Managerial implications

This study offers key implications for managers in TMOs. First, the special purpose of TMOs reinforce the need for constructing a clear narrative around their identities. This differentiates them from permanent businesses. Second, the shift from more formal to informal approaches to learning in TMOs reinforces the need to pay more attention to networks and groups of individuals, the focused conversations and their informal roles (e.g. boundary spanner, agents, champions etc.). Third, TMOs may find useful to share experiences with temporary and permanent organizations on what informal roles people construct. This will provide a better understanding of individual and organizational identities and better understanding of these roles. Lastly, TMOs may consider some suggestions made by the interviewees for creating 'learning organizations', such as the need for a digital platform for a specific industry to connect people based on their experiences.

A myriad of industries is delivering their organizational activities and driving learning via temporary multi-organizational arrangements. These forms of organizations are characterized by a high degree of uncertainty and lessons learned are often at risk of being dispersed as soon as members are disbanded and assigned to new jobs which shape the dynamic process of learning. TMOs continuously seek for new ways of building and enhancing alliance, governance, learning, and innovation capabilities in order to improve performance.

6.3 Research limitations and further research

We acknowledge the research limitations, some of which may serve as future research avenues. Further research may adopt a longitudinal approach into learning in temporary organizations in order to deepen our understanding of how learning characteristics impact organizational performance over time. The paper points towards the need to examine further the underlying identity construction processes of learning in TMOs. This would help to uncover the importance of leadership and informal roles played by boundary spanners, champions and leaders, and innovation agents with regards to learning in temporary organizations. Future research may also explore the use of other discourses such as symbolic (e.g. videos, material objects) in relation to learning in TMOs. This may deepen our understanding of various discursive resources used by individuals in re-learning processes in TMOs.

References

- Aldrich, H. and Herker, D. (1977), "Boundary spanning roles and organization structure", *Academy of Management Review*, Vol. 2 No. 2, pp. 217-230.
- Alvesson, M., Ashcraft, K. L. and Thomas, R. (2008), "Identity matters: Reflection on the construction of identity scholarship in organization studies", *Organization*, Vol. 15 No. 1, pp. 5-28.
- Aerts, G., Dooms, M., & Haezendonck, E. (2017), "Knowledge transfers and project-based learning in large scale infrastructure development projects: An exploratory and comparative ex-post analysis", *International Journal of Project Management*, Vol. 35 No. 3, pp. 224-240.
- Bakker, R. M., DeFillippi, R. J., Schwab, A. and Sydow, J. (2016), "Temporary organizing: Promises, processes, problems", *Organization Studies*, Vol. 37 No. 12, pp. 1703-1719.
- Bakker, R. M. and Janowicz-Panjaitan (2009), "Time matters: The impact of 'temporariness' on the functioning and performance of organizations. In: P. Kenis, M. Janowicz-Panjaitan, B. Cambré (eds) Temporary organizations. Prevalence, Logic and Effectiveness. Cheltenham and Northampton: Edward Elgar.
- Bartsch, V., Ebers, M. and Maurer, I. (2013), "Learning in project-based organizations: the role of project teams' social capital for overcoming barriers to learning", *International Journal of Project Management*, Vol. 31 No. 2, pp. 239-251.
- Bechky, B. A. (2006), "Gaffers, gofers, and grips: Role-based coordination in temporary organizations", *Organization Science*, Vol. 17 No. 1, pp. 3-21.
- Brady, T. and Davies, A. (2004), "Building project capabilities: From exploratory to exploitative learning", *Organization Studies*, Vol. 25 No. 9, pp. 1535-1555.

- Bresnen, M., Edelman, L., Newell, S., Scarbrough, H. and Swan, J. (2003), "Social practices and the management of knowledge in project environments", *International Journal of Project Management*, Vol. 21 No. 3, pp. 157-166.
- Brookes, N., Sage, D., Dainty, A., Locatelli, G. and Whyte, J. (2017), "An island of constancy in a sea of change: Rethinking project temporalities with long-term megaprojects". *International Journal of Project Management*, Vol. 35 No. 7, pp. 1213-1224.
- Brown, A. D. and Starkey, K. (2000), "Organizational identity and learning: A psychodynamic perspective". *Academy of Management Review*, Vol. 25 No. 1, pp. 102-120.
- Browning, B. W. and MsNamee, L. G. (2012), "Considering the temporary leader in temporary work arrangements: Sensemaking processes of internal interim leaders", *Human Relations*, Vol. 65 No. 6, pp. 729-752.
- Burke, C. M. and Morley, M. J. (2016), "On temporary organizations: A review, synthesis and research agenda", *Human Relations*, Vol. 69 No. 6, pp. 1235-1258.
- Calantone, R. J. and Cavusgil, S. T. (2002), "Learning orientation, firm innovation capability, and firm performance", *Industrial Marketing Management*, Vol. 31 No. 6, pp. 515-524.
- Clegg, S.R., Kornberger, M. and Rhodes, C. (2005), "Learning/Becoming/Organizing", *Organization*, Vol. 12 No. 2, pp. 147-167.
- Corley, K. G., and Gioia, D. A. (2004), "Identity ambiguity and change in the wake of a corporate spin-off", *Administrative Science Quarterly*, Vol. 49 No. 2, pp. 173-208.
- Davies, A., Brady, T. and Hobday, M. (2006), "Organizing for solutions: Systems seller vs systems integrator", *Industrial Marketing Management*, Vol. 36 No. 2, pp. 183-193.
- Davies, A., Gann, D., and Douglas, T. (2009), "Innovation in megaprojects: Systems integration at London Heathrow Terminal 5", *California Management Review*, Vol. 51 No. 2, pp. 101-125.

- Davies, A., Dodgson, M., Gann, D. & MacAulay, S. C. (2017), "Five rules for managing large, complex projects", *MIT Sloan Management Review*, Vol. 59 No. 1, pp. 73-78.
- Duffield, S. and Whitty, S. J. (2015), "Developing a systematic lessons learned knowledge model for organisational learning through projects", *International Journal of Project Management*, Vol. 33 No. 2, pp. 311-324.
- Ebers, M. and Maurer, I. (2016), "To continue or not to continue? Drivers of recurring partnering in temporary organizations", *Organization Studies*, Vol. 1 No. 35, pp. 1-24.
- Eisenhardt, K. (1989), "Building theories from case study research", *Academy of Management Review*, Vol. 14 No. 4, pp. 532-550.
- Flyvbjerg, B. (2014), "What you should know about megaprojects and why: An overview". *Project Management Journal*, Vol. 45 No. 2, pp. 6-19.
- Flyvbjerg, B. (2017), *The Oxford Handbook of megaproject management*, ed., Oxford University Press, Oxford, UK.
- Flyvbjerg, B., Bruzelius, N. and Rothengatter, W. (2003), *Megaprojects and risk: An anatomy of ambition*, Cambridge University Press, Cambridge, UK.
- Gann, D. M. and Salter, A. J. (2000), "Innovation in project-based, service enhanced firms: The construction of complex products and processes", *Research Policy*, Vol. 29 No. 7-8, pp. 955-972.
- Gann, D., Davies, A., & Dodgson, M.. (2017), "Innovation and flexibility in megaprojects", In B. Flyvbjerg *The Oxford Handbook of megaproject management*, ed., Oxford University Press, Oxford, UK, pp. 313-337.
- Gherardi, S., Nicolini, D. and Odella, F. (1998), "Toward a social understanding of how people learn in organizations", *Management Learning*, Vol. 29, pp. 273-297.

- Gibbert M., Ruigrok, W. and Wicki, B. (2008), "What passes as a rigorous case study?", *Strategic Management Journal*, Vol. 29, pp. 1465-1474.
- Gioia, D., Schulz, M. and Corley, K. (2000), "Organizational identity, image, and adaptive instability". *Academy of Management Review*, Vol. 25 No. 1, pp. 63-81.
- Grabher, G. (2004), "Temporary architectures of learning: Knowledge governance in project ecologies", *Organization Studies*, Vol. 25 No. 9, pp. 1491-1514.
- Handley, K., Sturdy, A., Fincham, R. and Clark, T. (2006), "Within and beyond communities of practice: Making sense of learning through participation, identity and practice", *Journal of Management Studies*, Vol. 43 No. 3, pp. 641-653.
- Hobday, M. (2000), "The project-based organization: An ideal form for management of complex products and systems?", *Research Policy*, Vol. 29 No. 7/8, pp. 871-893.
- Huang, Y., Luo, Y., Liu, Y. and Yang, Q. (2016), "An investigation of interpersonal ties in interorganizational exchanges in emerging markets", *Journal of Management*, Vol. 42 No. 6, pp. 1557-1587.
- Köhtamäki, M., Radetino, R. and Möller, K. (2018), "Alliance capabilities: A systematic review and future research directions", *Industrial Marketing Management*, Vo. 68, No. 1, pp. 188-201.
- Lentonen, P. and Martinsuo, M. (2008), "Change program initiation: Defining and managing the program – organization boundary", *International Journal of Project Management*, Vol. 26 No. 1, pp. 21-29.
- Linder, F. and Wald, A. (2011), "Success factors of knowledge management in temporary organizations", *International Journal of Project Management*, Vol. 29 No. 7, pp. 877-888.

- Manning, S. (2017), "The rise of project network organizations: Building core teams and flexible partner pools for interorganizational projects", *Research Policy*, Vol. 46 No. 8, pp. 1399-1415.
- Miles, M. B. and Huberman, A. M. (1994), *Qualitative data analysis*, Sage Publications, Thousand Oaks.
- Müller, R., Zhai, L. and Wang, A. (2017), "Governance and governmentality in projects: Profiles and relationships with success", *International Journal of Project Management*, Vol. 35 No. 3, pp. 378-392.
- Packendorff, J. (1995), "Inquiring into the temporary organization: New directions for project management research", *Scandinavian Journal of Management*, Vol. 11 No. 4, pp. 319-333.
- Perrone, V., Zaheer, A., and McEvily, B. (2003), "Free to be trusted? Organizational constraints on trust in boundary spanners", *Organization Science*, Vol. 14 No. 4, pp. 422-439.
- Poole, M. S. and Van de Ven, A. H. (1989), "Using paradox to build management and organization theories", *Academy of Management Review*, Vol. 14 No. 4, pp. 562-578.
- Prencipe, A. and Tell, F. (2001), "Inter-project learning: processes and outcomes of knowledge codification in project-based firms", *Research Policy*, Vol. 30 No. 9, pp. 1373-1394.
- Rouleau, L. (2005), "Micro-practices of strategic sensemaking and sensegiving: How middle managers interpret and change every day", *Journal of Management Studies*, Vol. 42 No. 7, pp. 1413-1441.

- Ryan, A. and O'Malley, L. (2016), "The role of boundary spanner in bringing about innovation in cross-sector partnerships", *Scandinavian Journal of Management*, Vol. 32 No. 1, pp. 1-9.
- Schwab, A. and Miner, A. S. (2008), "Learning in hybrid-project systems: The effect of project performance on repeated collaboration", *Academy of Management Journal*, Vol. 51 No. 6, pp. 1117-1149.
- Schultz, M. and Hernes, T. (2013), "A temporal perspective on organizational identity", *Organization Science*, Vol. 24 No. 1, pp. 1-21.
- Stamper, C. L. and Johlke, M. C. (2003), "The impact of perceived organizational support on the relationship between boundary spanner role stress and work outcomes", *Journal of Management*, Vol. 29 No. 4, pp. 569-588.
- Stjerne, I. S. and Svejenova, S. (2016). "Connecting temporary and permanent organizing: Tensions and boundary work in sequential film projects", *Organization Studies*, Vol. 37 No. 12, pp. 1771-1792.
- Sydow J., Lindkvist L. and DeFillippi R. (2004), "Project-based organizations, embeddedness and repositories of knowledge: Editorial", *Organization Studies*, Vol. 25 No. 9, pp. 1475–1489.
- Tempest, S. and Starkey, K. (2004), "The effects of liminality on individual and organizational learning", *Organization Studies*, Vol. 25 No. 4, pp. 507-527.
- Tennant, S. and Fernie, S. (2013), "Organizational learning in construction supply chains", *Engineering, Construction and Architectural Management*, Vol. 20 No. 1, pp. 83-98.
- Vaara, E., Sonenshein, S. and Boje, D. (2016), "Sources of stability and change in organizations: Approaches and directions for future research", *The Academy of Management Annals*, Vol. 10 No. 1, pp. 495-560.

Watkins, K. and Marsick, V. (1996), *In action: Creating the learning organization*, ASTD Press, Alexandria, VA.

Weick, K.E., Sutcliffe, K.M. and Obstfeld, D. (2005), "Organizing and the process of sensemaking", *Organization Science*, Vol. 16 No. 4, pp. 409-421.

Williams, T., & Samset, K. (2010), "Issues in front-end decision-making on projects", *International Journal of Project Management*, Vol. 41 No. 2, pp. 38-49.

Winch, G. M. (2014), "Three domains of project organizing", *International Journal of Project Management*, Vol. 32 No. 5, pp. 721-731.

Wolstenholme, W. (2009), *Never waist a good crisis. A review of progress since rethinking construction and thoughts for our future*, Constructing Excellence, London.

Zaheer, A., McEvily, B. and Perrone, V. (1998), "Does trust matter? Exploring the effects of inter-organizational and interpersonal trust on performance", *Organization Science*, Vol. 9 No. 2, pp. 123-141.

Zerjav, V., Edkins, A., Davies, A. (2018), "Project capabilities for operational outcomes in inter-organisational settings: The case of London Heathrow Terminal 2", *International Journal of Project Management*, Vol. 36 No. 3, pp. 444-459.

Table 1 Key characteristics of TMOs, learning and their effect on performance

Characteristics of TMOs	Key learning characteristics and their influence on performance	Authors	Identified gaps
Multiple and complex temporariness	<p>Intended temporary life spans (can be long-term but there is an end date) with the new configurations of team members at different stages of the life cycle is a source of innovation</p> <p>Temporary organizations are better able to develop creative solutions and innovative outputs, but are less able to successfully sediment knowledge in the wider context as compared to permanent organizations</p> <p>Some categories of projects are similar and therefore involve repeatable and predictable patterns of activity</p>	<p>Burke and Morley (2016) Brookes <i>et al.</i> (2017)</p> <p>Bakker and Janowicz-Panjaitan (2009) Sydow <i>et al.</i> (2004)</p> <p>Brady and Davies (2004)</p>	<p>Fundamentally different organizing principles between temporary and permanent organizations are acknowledged, there is a temporary/permanent dilemma</p> <p>The issue of how learning within TMOs become captured and subsequently transferred to the wider context has been focus of much research</p>

Transient	<p>Role-based (rather than person-based) interactions TMOs operate on a minimal basis of shared knowledge and tend to become less well-developed groups Leader orientation-performance relationship Group longevity influences the information processing behavior that in turn affects its performance</p> <p>Boundary-spanning activities that facilitate organizational learning</p>	<p>Burke and Morley (2016)</p> <p>Grabher (2004)</p> <p>Tempest and Starkey (2004)</p>	<p>Scholars disagree on the extent to which social interaction between team members require in temporary multi-organizing The role of leadership is under-explored in the literature</p> <p>There is a recognition of the shift from job- or person-based to role-based social interactions in TMOs, yet there is a lack of empirical evidence</p> <p>It is crucial to explore how, in a more transient organizational context arising from the greater use of temporary teams, individualized careers, fashioned out of liminality, impact upon organizational learning and performance improvement</p>
Special Purpose Vehicle (SPV)	<p>Lessons learned from the past experiences Recognition of value of knowledge and motivation</p> <p>Learning is part of the organizational culture</p>	<p>Brookes <i>et al.</i> (2017) Burke and Morley (2016) Davies <i>et al.</i> (2017)</p> <p>Wei and Miraglia (2017)</p>	<p>Some scholars argue that knowledge is valued more for its usefulness to the immediate task and performance demands of the TMO than to any wider context. Other argue that there is the unique and non-recurring nature of TMO activities that provides little scope for routinized learning</p>

Table 2 List of interviewees and information about temporary and permanent organizations

#	Position in the organization	Years of experience	Professional background	Label	Nature of TOs	Number of employees	Length of interview (in mins)
1	Project manager	30	Quantity Surveying	PO2	Construction project-based organization (contractor)	2,500	61
2	Chartered civil engineer	13	Civil engineering	PO2	Civil engineering project-based organization (contractor)	250	45
3	Project manager	49	Quantity Surveying	PO2	Engineering project-based organization (contractor)	4,349	65
4	Group innovation knowledge manager	12	Business and management	PO2	Construction project-based organization (contractor)	4,349	70
5	Business improvement manager	9	Business and management	PO2	Housebuilding and construction project-based organization (contractor)	3,000+	65
6	Planning manager	13.5	Planning management	PO2	Construction contractor	2,902	67
7	Business development manager	11	Organizational and business profession	PO2	Civil engineering project-based organization (contractor)	50,000	45
8	Design and geotechnical manager	15	Civil engineering	PO2	Civil engineering project-based organization (contractor)	50,000	55
9	Senior advisor, development director	25	Civil engineering	PO2	Construction project-based organization (contractor)	4,349	60
10	Principal program supply chain manager	30	Quantity Surveying, construction management	TMO	Client public transport	2,500	68
11	Business director	33	Chartered building	PO2	Construction project-based organization (contractor)	8,132	56
12	Strategic project director	15	Roads and transportation	TMO	Rail and transportation ('pop-up' client)	50000	45

13	Managing director	23	Civil engineering	PO2	Regional building and civil engineering contractor	320	32
14	Procurement operation manager	30	Surveying	TMO	Transport infrastructure ('pop-up' client)	1,000	60
15	Procurement director	25	Chartered Surveying	TMO	Transport infrastructure ('pop-up' client)	1,000	41
16	Managing director	27	Chartered Building	PO1	Construction project-based organization (client)	400	47
17	Head of Building Information Modelling (BIM)	25	Information technology	PO2	Construction project-based organization (contractor)	6,000	60
18	Chief Executive Officer	29	Aerospace and engineering	TMO	Transport infrastructure ('pop-up' client)	800	35
19	Chief Executive Officer	30	Civil Engineering	TMO	Transport infrastructure ('pop-up' client)	2,500	64
20	Procurement Director	30	Chartered Surveying	TMO	Transport infrastructure ('pop-up' client)	2,500	67
21	Chief Executive Officer	30	Civil engineering	TMO	Water infrastructure ('pop-up' client)	4,000	75
22	Chief Executive Officer	20	Law	PO2	Engineering project-based organization (contractor)	15,000	70
23	Regional Managing Director	19	Roads and transportation	PO2	Construction and engineering project-based organization (contractor)	26,000	55
24	Chief Executive Officer	30	Civil engineering	PO2	Multinational construction project-based organization (contractor)	50,000	60
25	Chief Executive Officer	40	Business and management	PO1	Road infrastructure operator (client)	20,000	70
26	Innovation Manager	25	Business and management	TMO	Water infrastructure ('pop-up' client)	4,000	45

27	Program Control Director	15	Civil engineering	TMO	Rail infrastructure ('pop-up' client)	20,000	65
28	Head of Innovation	40	MBA	TMO	Water infrastructure ('pop-up' client)	4,000	45
29	Director of Asset Management	35	Civil Engineering	PO1	Water infrastructure permanent (client)	4,000	60
30	Chief Executive Officer	40	MBA	TMO	Airport infrastructure ('pop-up' client)	10,000	75
31	Development Director	25	MBA	TMO	Airport infrastructure ('pop-up' client)	10,000	60
32	Director of Innovation and Continuous Improvement	13	Civil Engineering	PO1	Road infrastructure operator (client)	20,000	30
33	Project and Program Manager	30	Project Management	PO1	Transport infrastructure owner and operator (client)	25,000	60
Overall interview recording							1,877 mins

** The TMOs are set up as regulated businesses created for the purpose to build and manage physical assets or facilities such as roads, bridges, buildings, tunnels and water supply. British construction, engineering and infrastructure TMOs ('pop up clients') are characterized by a large investment commitment; high level of uncertainty; specified timeframe; vast complexity and coalition of clients, suppliers and consultants, long-lasting impact on the economy, society, environment and society; top managers and team members regularly changing their positions within and across TMOs. The selected PO1 are permanent UK construction, infrastructure and engineering client/owner and operator organizations responsible for operating, maintaining services or customers. The selected PO2 are UK construction, infrastructure and engineering permanent project-based supplier organizations, offering diverse services ranging from design, construction and project management services to clients. (based on Winch, 2014).*

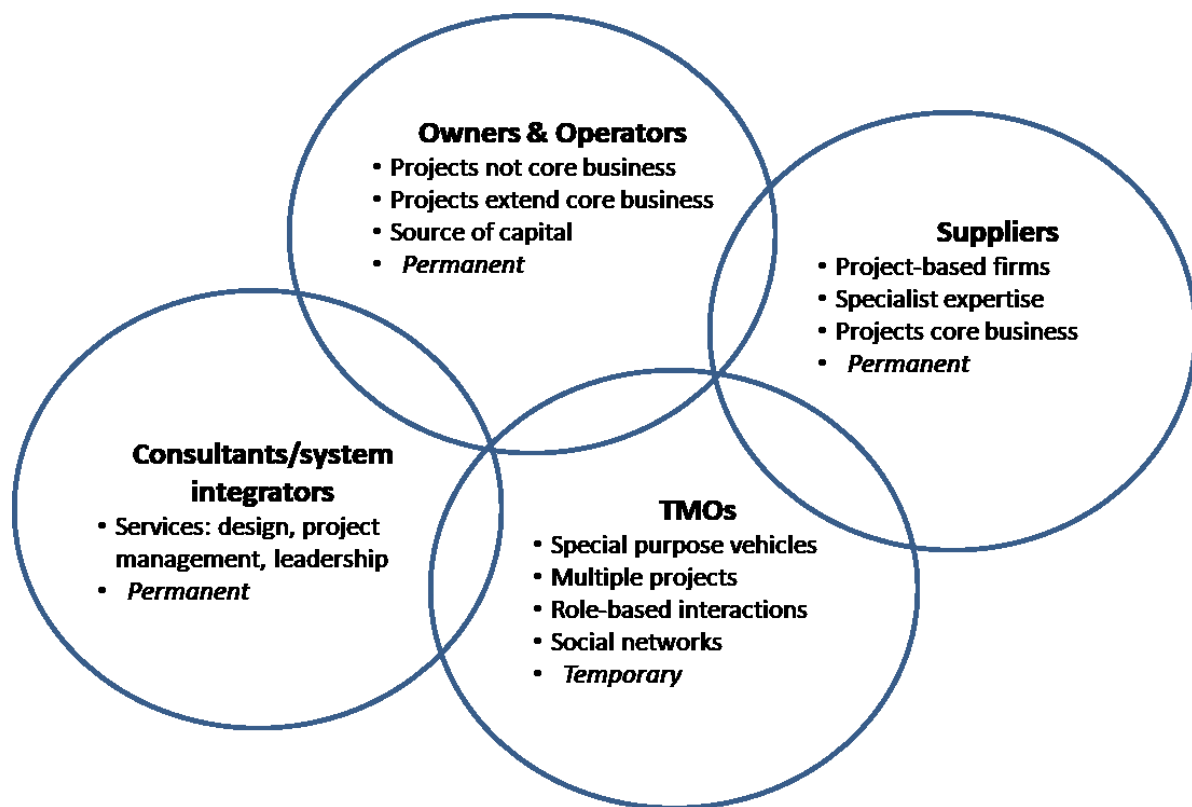
Table 3 Interviewees' quotations on TMO characteristics and their impact learning and performance

Characteristics of TMOs	Key learning characteristics and their influence on performance	Representative quotes
Multiple and complex temporariness	Learning faster	<i>"We had a sense of urgency in a business where normally we had one or two years to plan and then a year or two to deliver. We had to do all of that in '15 minutes'. And then we had a recession in 2010 with big cuts in funding. [...] And then over the last 18 months, I had to build it up again. In 7 years you change your senior team, you change people. You might change structure. [...] The world has changed very fast and we have quite demanding customers."</i> (CEO of a major road infrastructure operator, #25)
	Temporary/permanent dilemma	<i>"Even so projects are temporary, long-term, we consider permanency here. There is a permanency in people more than in the organization."</i> (CEO from a major water TMO, #21)
	Sharing experiences Transferring learning internally in TMOs	<i>"You need others [boundary-spanners] around in TMOs to share experience, to actually realize your conversation is here. How are you actually transferring all learning? [...] You have delivery managers [boundary-spanners], who transfer a lot of learning to other TMO members. It is difficult with so many emails going around and now we have social media: Twitter [...]. So, we encourage them [boundary-spanners] to come and give us ideas what they think."</i> (Head of Innovation, Water infrastructure TMO, #28)
Transient nature of the business	People bring past experiences from TMOs into new TMOs Mind-set and culture	<i>"Right from the beginning we collected the information how other high speed rails have been developed. Some of that share come from people, rather than specific knowledge sharing program. A</i>

	Key individuals and organizations engaging in the learning process	<p><i>large proportion of people have experience in past megaprojects. We had workshops on particular topics to share learning. We actually adopted a lot of things.” (CEO, rail TMO, #19)</i></p> <p><i>“Looking back is more about to say what worked and what did not [in a previous TMO] from sort of lessons point of view. How can we use the best of that and apply in the context of [current TMO] to be more creative? it comes to the point of mind-set. We all bring our experience of previous projects and previous lives into the project. And it is about looking forward: how do we organise all that experience, all that creative thinking in a context of [name of TMO] and get the best of everybody to get it delivered.” (CEO, rail TMO, #18)</i></p> <p><i>“The way we are looking at it now is that you do not want to wait until transfer, actually you want key people [boundary-spanners] and organizations to engage all the way through. There are learning points all the way through.” (Innovation Manager, water infrastructure TMO, #26)</i></p>
Special Purpose Vehicle (SPV)	<p>Unique purpose drives learning and performance</p> <p>Constructing a narrative about TMO</p> <p>Creation of a network</p>	<p><i>“I think what you are seeing now over the last 5-10 years is when you have an ability to create a special purpose client, a ‘pop-up’ client to deliver one major program. Then they tend to do it well, because you are designing the right client organization from day 1 fit to deliver that one goal” (Program Control Director, rail TMO, #27).</i></p> <p><i>“I am a huge believer in knowledge management system that allows people to learn. I am a huge believer in when somebody starts something they go and talk to people who have done something similar before. So, we are learning in the organization from people who have done runways before” (Development</i></p>

		<p>Director, Airport infrastructure TMO, #31)</p> <p><i>"I am trying to create a Hub for UK infrastructure you have a really good chance to actually create value. [...] To me, it is information plus I think experience that creates value and you have wisdom. Wisdom is not something that you write down, but you need to share with other members."</i> (CEO, transport infrastructure TMO, #18)</p>
--	--	--

Figure 1



Appendix - Industry events and workshops

Hosting institution/organization	Name of the event	Date	Duration (in h)
The Bartlett School of Construction & Project Management, UCL	A series of infrastructure keynote lectures with leaders of UK infrastructure	2014-2018 once a month	40
Professional Development Network/HS2/Thames Tideway/Crossrail/Midlands Metro	HS2 PDN Conference: Stakeholder Engagement	15/02/2018	8
Association for Project Management (APM)	Crossrail 2: Applying the governance lessons from Crossrail 1	09/05/2017	2
Institute of Civil Engineers (ICE)	State of the Nation 2017: Digital Engineering	22/03/2017	3
Major Projects Association (MPA)	Major Projects Knowledge Hub Launch The role of facilitator of Knowledge Café	24/05/2017	3
Major Projects Association (MPA)	Tried and tested vs innovation in major projects	26/04/2017	2
Major Projects Association (MPA)	Representative meeting	14/03/2017	2
Major Projects Association (MPA)	Success and Failure	25/01/2017	2
Major Projects Association (MPA)	Portfolio and Program Management	08/12/2016	2
Major Projects Association (MPA)	Gender Balance, Equal or Different	05/11/2015	2
Oxford Major Program Management Team	Legacy of major programs: Making good on our promises	11/11/2016	8
Thames Tideway Tunnel (TTT)	Alliance ECP Summer Event	30/06/2016	3
High Speed 2 (HS2)	industry and academia	06/04/2016	6
Constructing Excellence (CE)	Higher education brokerage workshop	14/03/2017	4
Constructing Excellence (CE)	Constructing Excellence members forum	08/06/2016	7
Constructing Excellence (CE)	Constructing Excellence collaborative working champions	03/12/2015	4
Constructing Excellence (CE)	Beyond the built environment: Constructing Excellence annual conference	11/11/2015	7
Constructing Excellence (CE)	Constructing Excellence conference	10/06/2015	8
Constructing Excellence (CE)	Innovation	10/02/2015	7
Constructing Excellence (CE)	Never waist a good crisis	18/12/2014	4
<i>Total time spent at events/workshops:</i>			<i>124h</i>